

# PATENT SPECIFICATION

844,644

DRAWINGS ATTACHED.



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## COMPLETE SPECIFICATION.

### Taper Drive or Locking Pins.

I, FRANCIS EDMUND VAUGHAN, a British Subject, of 43 The Mount, Coventry, Warwickshire, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to taper drive or locking pins as used for locking a member such as a gear or pulley to a shaft (i.e. wherein the pin is driven into aligned radial holes in the member and shaft) or for similar purposes and has for its object to provide an improved form of pin which can be readily produced in uniform pin sizes for ensuring a proper and firm fit in a hole of appropriate size whilst the latter does not require to be tapered.

I am aware that it has hitherto been proposed to provide fastening bolts, drive-screws, screw nails or connector or locking pins in which a parallel shank or shank portion or portions is provided, with projections in the nature of ribs, threads, barbs or studs for engaging the metal or material of a hole into which the bolt, screw or pin is driven. Of such prior proposals I am aware that in the case of a ribbed or threaded bolt or drive screw it has been proposed to provide one set of ribs or threads circumferentially offset in relation to another set of ribs or threads on the parallel shank or shank portion and with or without a peripheral plain portion between the two sets of ribs or threads whilst the sets of the latter may be both straight or both spiral.

According to this invention a taper drive or locking pin is characterised by serrated or knurled portions about the periphery thereof, said serrated or knurled portions

being separated by one or more plain peripheral land portions and being raised relative to the latter whereby the leading edge of each serrated or knurled portion serves in effect as a cutting edge, said cutting edges being such as to have a broaching or swaging or similar engagement as the pin is driven into a hole or aligned holes therefor whilst a succeeding cutting edge so provided is of greater effective diameter than a preceding cutting edge.

In the accompanying drawings:—

Figure 1 is an elevation of one form of drive pin or locking pin according to this invention;

Figure 2 is a cross section on an enlarged scale; and

Figures 3, 4 and 5 are elevational views similar to Figure 1 of alternative forms of pins embodying the invention.

Referring to the drawings and in practice a pin embodying this invention may be of the usual taper form shown in chrome vanadium steel, mild steel, brass or other suitable material and has one or more finely serrated portions 1 (Figure 1) of knurled portions 2 (Figure 3) about its periphery such as two or three such portions 1 or 2 separated by plain peripheral lands 3.

The said portions 1 or 2 may be produced by means of a knurling wheel or other suitable means and due to the action of the latter the serrated or knurled portions 1 or 2 are raised relative to the lands 3 (Figure 2) so that on the pin being driven into a parallel hole of appropriate size therefor in material of softer nature than the pin, the leading edges of the knurled or serrated portions 1 or 2 at the lands 3 serve as cutting edges 4 with the result that the pin has a broaching and swaging action as it is driven

into the hole or into aligned holes (e.g. in a wheel hub and shaft). In this way the pin firmly engages the hole or holes, whilst it will be noted that each succeeding cutting edge 4 is of greater effective diameter than a preceding cutting edge.

As shown in Figure 1 the serrations 1 may be straight, that is to say, longitudinal in relation to the axis of the pin or they may be helical as at 1<sup>1</sup> in Figure 4. If desired the spiral serrations of one portion may be of opposite hand to those of another or adjacent portion as indicated at 1<sup>2</sup> in Figure 5. In the case of helical serrations 1<sup>1</sup> or 1<sup>2</sup> their cutting action is rather that of shaving the material of the hole wall instead of broaching.

The leading narrower part of the pin may have a serrated or knurled portion 1, 1<sup>1</sup>, 1<sup>2</sup>, or 2 or may be left plain as a pilot portion 5 as shown. The extent of the serrated or knurled portion or portions 1, 1<sup>1</sup>, 1<sup>2</sup> or 2 should be such as to obtain a firm engagement with two parts to be locked together such as a hub and shaft.

It is possible to manufacture pins in accordance with this invention with a tolerance on the serrations 1, 1<sup>1</sup>, or 1<sup>2</sup> or knurling 2 of the order of .001" so that especially in the case of small pins uniformity of size is ensured for consistently obtaining a firm and proper fit in a hole or aligned holes of corresponding size.

Thus the unsatisfactory conditions hitherto and often encountered with known locking or drive pins (in which an oversize pin is difficult to insert and an undersize pin results in a loose fit) is overcome or greatly minimised. In contrast a pin according to this invention may be readily driven into position to obtain a satisfactory fit. Undue force is not necessary such as might cause damage (e.g. the bending of a shaft) in gear or other mechanism in which the pins are employed.

Where the pin is driven into a hole in material that is harder than that of the pin the serrations 1, 1<sup>1</sup> or 1<sup>2</sup> or knurling 2 are

flattened or spread to maintain a firm frictional engagement with the wall of the hole.

#### WHAT I CLAIM IS:—

1. A taper drive or locking pin characterised by serrated or knurled portions about the periphery thereof, said serrated or knurled portions being separated by one or more plain peripheral land portions and being raised relative to the latter whereby the leading edge of each serrated or knurled portion serves in effect as a cutting edge, said cutting edges being such as to have a broaching or swaging or similar engagement as the pin is driven into a hole or aligned holes therefore whilst a succeeding cutting edge so provided is of greater effective diameter than a preceding cutting edge.

2. A drive or locking pin according to Claim 1 in which a serrated portion or portions is or are longitudinally serrated.

3. A drive or locking pin according to Claim 1 in which a serrated portion or portions is or are helically or spirally serrated.

4. A drive or locking pin according to Claim 3 wherein the helical or spiral serrations are of the same hand on all serrated portions on the pin.

5. A drive or locking pin according to Claim 3 wherein the helical serrations are of opposite hand on different serrated portions on the pin.

6. A drive or locking pin according to any of the preceding claims wherein a reduced pilot portion is provided at the leading end of the pin.

7. A drive or locking pin substantially as herein described with reference to Figures 1 and 2 or Figures 3 or 4 or 5 of the accompanying drawings.

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#### PROVISIONAL SPECIFICATION.

##### Drive or Locking Pins.

I, FRANCIS EDMUND VAUGHAN, a British Subject, of 43 The Mount, Coventry, Warwickshire, do hereby declare this invention to be described in the following statement:—

This invention relates to drive or locking pins as used for locking a member such as a gear or pulley to a shaft (i.e. wherein the pin is driven into aligned radial holes in the member and shaft) or for similar purposes and has for its object to provide an improved form of pin which can be readily

produced in uniform pin sizes for ensuring a proper and firm fit in a hole of appropriate size whilst the latter does not require to be tapered.

According to the invention a drive or locking pin is characterised by one or more knurled or serrated portions about the periphery thereof adapted to engage the wall of a hole for the pin so as to obtain a firm and proper fit in said hole.

In practice a pin embodying this invention may be of the usual taper form in chrome

vanadium steel, mild steel, brass or other suitable material and has one or more knurled or finely serrated portions about its periphery such as two or three portions separated by plain peripheral lands.

5 The said portions may be produced by means of a knurling wheel or other suitable means and due to the action of the latter the knurled or serrated portions are raised relative to the lands so that on the pin being  
10 driven into a parallel hole of appropriate size therefor in material of a softer nature than the pin, the edges of the knurled or serrated portions at the lands serve as cutting  
15 edges with the result that the pin has a broaching and swaging action as it is driven into the hole or into aligned holes (e.g. in a wheel hub and shaft). In this way the pin firmly engages the hole or holes.

20 The serrations may be straight, that is to say, longitudinal in relation to the axis of the pin or they may be helical in which latter event the spiral serrations of one portion may be of opposite hand to those of another  
25 or adjacent portion. In the case of helical serrations their cutting action is rather that of shaving the material of the hole wall instead of broaching.

30 The leading narrower part of the pin may have a knurled or serrated portion or may be left plain as a pilot portion. The extent of the knurled or serrated portion or portions should be such as to obtain a firm engage-

ment with two parts to be locked together such as a hub and shaft.

It is possible to manufacture pins in accordance with this invention with a tolerance on the knurling or serrations of the order of .001" so that especially in the case of small pins uniformity of size is ensured for consistently obtaining a firm and proper fit in a hole or aligned holes of corresponding size.

Thus the unsatisfactory conditions hitherto and often encountered with known locking or drive pins (in which an oversize pin is difficult to insert and an undersize pin results in a loose fit) is overcome or greatly minimised. In contrast a pin according to this invention may be readily driven into position to obtain a satisfactory fit. Undue force is not necessary such as might cause damage to gear or other mechanism in which the pins are employed such as the bending of a shaft.

Where the pin is driven into a hole in material that is harder than that of the pin the knurling or serrations are flattened or spread to maintain a firm frictional engagement with the wall of the hole.

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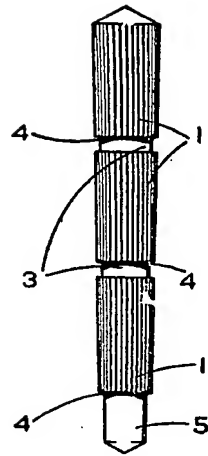


FIG. 1.

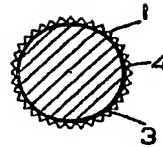


FIG. 2.

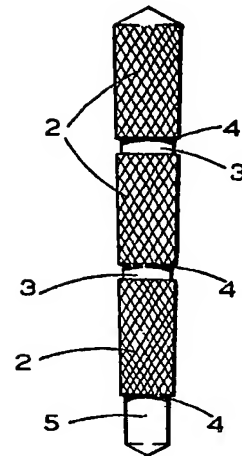


FIG. 3.

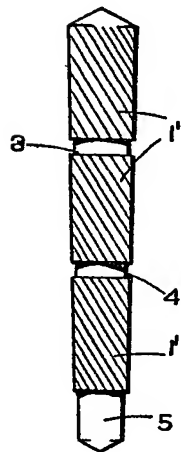


FIG. 4.

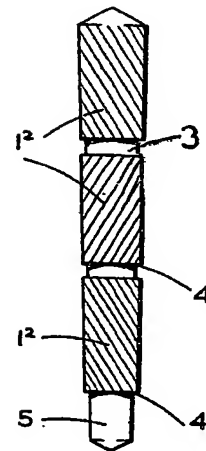


FIG. 5.